

CLAIMS

1. A battery having an apparatus for monitoring the battery, the battery comprising:
one or more cells that provide power to at least one output; and
a monitor that is adapted to monitor and store performance information relating to the
5 operation of the one or more cells, and which is adapted to communicate with an external
system, and that is adapted to receive a monitor signal from an external system, wherein the
monitor is coupled to the one or more cells and is adapted to receive power for the monitor
from the external system.
- 10 2. The battery according to claim 1 in combination with an Uninterruptible Power
Supply (UPS) system.
3. The battery according to claim 1, wherein the monitor is adapted to perform a reset if
the received power is insufficient.
- 15 4. The battery according to claim 1, wherein the monitor includes an associated memory
in which the monitor is adapted to store the performance information.
5. The battery according to claim 4, wherein the memory is a nonvolatile-type memory.
- 20 6. The battery according to claim 5, wherein the nonvolatile-type memory is an
EEPROM.
7. The battery according to claim 1, wherein the monitor is adapted to communicate with
25 the external system by interrupting current of received power provided by the external
system.
8. The battery according to claim 1, wherein the monitor is adapted to receive a monitor
signal from the external system and wherein the monitor is adapted to receive power from the
30 external system via the monitor signal.

9. The battery according to claim 7, wherein the monitor is adapted to communicate in an asynchronous manner with the external system.

10. The battery according to claim 9, wherein a start of communication with the battery is initiated by the external system by interrupting the current of the power supply.

11. The battery according to claim 10, wherein the monitor is adapted to detect the start of communication, and is adapted to receive, after the start of communications is detected, a request message from the external system.

12. The battery according to claim 11, wherein the monitor is adapted to transmit a response message in response to the received request message.

13. The battery according to claim 12, wherein the monitor comprises an LC-type oscillator that provides clocking for the monitor.

12. The battery according to claim 12, wherein the monitor comprises a crystal oscillator that provides clocking for the monitor.

13. The battery according to claim 1, wherein the monitor is adapted to store manufacturing information relating to the battery.

14. The battery according to claim 13, wherein the manufacturing information includes a model type of the battery, and wherein the monitor is adapted to communicate the model type to the external system.

15. The battery according to claim 13, wherein the manufacturing information includes a serial number of the battery, and wherein the monitor is adapted to communicate the serial number to the external system.

16. The battery according to claim 13, wherein the manufacturing information includes rating information of the battery, and wherein the monitor is adapted to communicate the rating information to the external system.

5 17. The battery according to claim 13, wherein the manufacturing information includes a manufacturing date of the battery, and wherein the monitor is adapted to communicate the manufacturing date to the external system.

10 18. The battery according to claim 13, wherein the manufacturing information includes one or more battery constants, and wherein the monitor is adapted to communicate the one or more battery constants to the external system.

15 19. The battery according to claim 13, wherein the manufacturing information includes one or more battery constants that relate to the battery's expected performance, and wherein the monitor is adapted to communicate the one or more battery constants to the external system.

20 20. The battery according to claim 13, wherein the battery further comprises a temperature sensor, and wherein the manufacturing information includes one or more constants relating to the temperature sensor, and wherein the monitor is adapted to communicate the one or more constants to the external system.

25 21. The battery according to claim 13, wherein the battery further comprises a resistor used to detect current provided by the battery, and wherein the manufacturing information includes parameters related to the resistor, and wherein the monitor is adapted to communicate the parameters related to the resistor to the external system.

30 22. The battery according to claim 1, wherein the monitor is adapted to store performance information indicating performance of the battery.

23. The battery according to claim 1, wherein the monitor is adapted to store the performance information periodically.

24. The battery according to claim 1, wherein the performance information includes a count of the number of discharges of the battery, and wherein the monitor is adapted to communicate the number of discharges of the battery to the external system.

5 25. The battery according to claim 1, wherein the performance information includes a software identifier of the monitor, and wherein the monitor is adapted to communicate the software identifier of the monitor to the external system.

10 26. The battery according to claim 1, wherein the performance information includes a temperature of the battery, and wherein the monitor is adapted to communicate the temperature of the battery to the external system.

15 27. The battery according to claim 1, wherein the performance information includes an accumulated time that the battery is in a charge state, and wherein the monitor is adapted to communicate the accumulated time to the external system.

20 28. The battery according to claim 1, wherein the performance information includes an accumulated time that the battery is in a floating state, and wherein the monitor is adapted to communicate the accumulated time to the external system.

29. The battery according to claim 1, wherein the performance information includes an accumulated time the battery is in a discharging state, and wherein the monitor is adapted to communicate the accumulated time to the external system.

25 30. The battery according to claim 1, wherein the performance information includes a maximum temperature experienced by the battery, and wherein the monitor is adapted to communicate the maximum temperature to the external system.

30 31. A method for communicating with a battery, comprising acts of:
providing for a single-wire interface to the battery;
receiving, at the battery over the single-wire interface, a request for information from an external system; and

transmitting, by the battery to the external system over the single-wire interface , a response to the request.

32. The method according to claim 31, wherein the battery receives power over the single-wire interface and wherein the act of transmitting comprises an act of transmitting data over the single-wire interface by interrupting current.

33. The method according to claim 31, wherein the act of transmitting comprises an act of transmitting data asynchronously.

34. The method according to claim 31, wherein the act of transmitting comprises an act of transmitting battery model type data to the external system.

35. The method according to claim 31, wherein the act of transmitting comprises an act of transmitting serial number data to the external system.

36. The method according to claim 31, wherein the act of transmitting comprises an act of transmitting rating information related to the battery to the external system.

37. The method according to claim 31, wherein the act of transmitting comprises an act of transmitting manufacturing data to the external system.

38. The method according to claim 31, wherein the act of transmitting comprises an act of transmitting a manufacturing date of the battery to the external system.

39. The method according to claim 31, wherein the act of transmitting comprises an act of transmitting battery constant data to the external system.

40. The method according to claim 31, wherein the act of transmitting comprises an act of transmitting temperature data to the external system.

41. The method according to claim 31, wherein the act of transmitting comprises an act of transmitting data relating to a temperature sensor of the battery to the external system.

42. The method according to claim 31, wherein the act of transmitting comprises an act of transmitting manufacturing data to the external system.

5 43. The method according to claim 31, wherein the battery comprises a resistor used to detect current and wherein the act of transmitting comprises an act of transmitting one or more parameters that relate to the resistor to the external system.

44. The method according to claim 31, wherein the act of transmitting comprises an act of
10 transmitting a serial number of the battery to the external system.

45. The method according to claim 31, wherein the battery includes a processor that executes software and wherein the act of transmitting comprises an act of transmitting a software identifier of the software to the external system.

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46. The method according to claim 31, wherein the act of transmitting comprises an act of transmitting battery type data that identifies a type of the battery to the external system.

47. The method according to claim 31, further comprising an act of storing performance
20 data relating to the performance of the battery in a memory of the battery.

48. The method according to claim 47, wherein the act of storing further comprises an act of storing the performance data in a nonvolatile memory associated with the battery.

25 49. The method according to claim 31, wherein the external system is a UPS.

50. The method according to claim 31, further comprising an act of receiving, by a monitor circuit of the battery, power over the single-wire interface.

30 51. The method according to claim 48, further comprising an act of providing for communicating to the battery over a single-wire interface, the interface being used to provide power to a monitoring circuit of the battery.